

WHAT IS CLAIMED IS:

1. An X-ray generating apparatus comprising:

an X-ray tube for generating, within a housing sealed into vacuum, an X-ray by focusing an electron emitted from a cathode into an anode target by way of a first grid electrode, a second grid electrode, and a focusing electrode;

grid voltage control means for controlling a grid voltage applied to said first grid electrode; and

pulse generating means for generating a pulse which changes from an OFF state to an ON state and keeps said ON state for a predetermined period of time;

wherein said grid voltage control means applies, in response to said pulse generated by said pulse generating means, a cutoff voltage to said first grid electrode when said pulse is in said OFF state so as to prevent said electron emitted from said cathode from reaching said anode target, and applies to said first grid electrode, in response to said pulse generated by said pulse generating means, a grid operating voltage adjusted such that said electron emitted from said cathode so as to bombard said anode target attains a predetermined amount of quantity when said pulse is in said ON state.

2. An X-ray generating apparatus according to claim 1, wherein said grid voltage control means has cathode current detecting means for detecting a cathode current and, in response to said pulse generated by said pulse generating

means, applies to said first grid electrode a grid operating voltage adjusted such that said cathode current detected by said cathode current detecting means attains a predetermined value when said pulse is in said ON state.

5

3. An X-ray generating apparatus according to claim 2, wherein said cathode current detecting means has a cathode current detecting resistor, connected to said cathode, for detecting said cathode current; and

10

wherein said grid voltage control means has:
a negative voltage generating section for generating a predetermined negative voltage;

15

a pulse inverter for inputting said pulse generated by said pulse generating means and generating an inverted pulse in which said ON and OFF states of said inputted pulse are inverted;

20

a first switch for inputting said inverted pulse generated by said pulse inverter and outputting, when said inverted pulse is in said ON state, said predetermined negative voltage generated by said negative voltage generating section;

a reference voltage generating section for generating a reference positive voltage;

25

a second switch for inputting said pulse generated by said pulse generating means and outputting, when said pulse is in said ON state, said reference positive voltage generated by said reference voltage generating section;

an operational amplifier having one input terminal for inputting a voltage generated by said cathode current detecting resistor and the other input terminal for inputting said predetermined negative voltage outputted from said first switch and said reference positive voltage outputted from said second switch; and

a grid voltage control circuit for controlling, in response to an output from said operational amplifier, said grid voltage applied to said first grid electrode.

4. An X-ray imaging apparatus comprising imaging means for capturing an X-ray transmission image formed upon irradiating an object to be inspected with an X-ray generated by the X-ray generating apparatus according to claim 1;

wherein said imaging means receives said pulse generated by said pulse generating means and captures said X-ray transmission image when said pulse is in said ON state.

5. An X-ray inspection system comprising the X-ray generating apparatus according to claim 1, an X-ray imaging apparatus having imaging means for capturing an X-ray transmission image formed upon irradiating an object to be inspected with an X-ray generated by said X-ray generating apparatus; and object detecting means for detecting arrival of said object in an imaging area in said X-ray imaging apparatus;

wherein said pulse generating means has trigger signal outputting means for outputting a trigger signal according

to said detection of said object by said object detecting means and outputs said pulse when said trigger signal is outputted from said trigger signal outputting means; and

wherein said imaging means receives said pulse outputted from the pulse generating means and captures said X-ray transmission image when said pulse is in said ON state.

6. An X-ray generating apparatus comprising:

an X-ray tube having a cathode, an anode target, and a first grid electrode, a second grid electrode, and a focusing electrode which are disposed between said cathode and said anode target; and

grid voltage control means for controlling a grid voltage applied to said first grid electrode such that a pulsing X-ray having a predetermined pulse width is generated from said X-ray tube.